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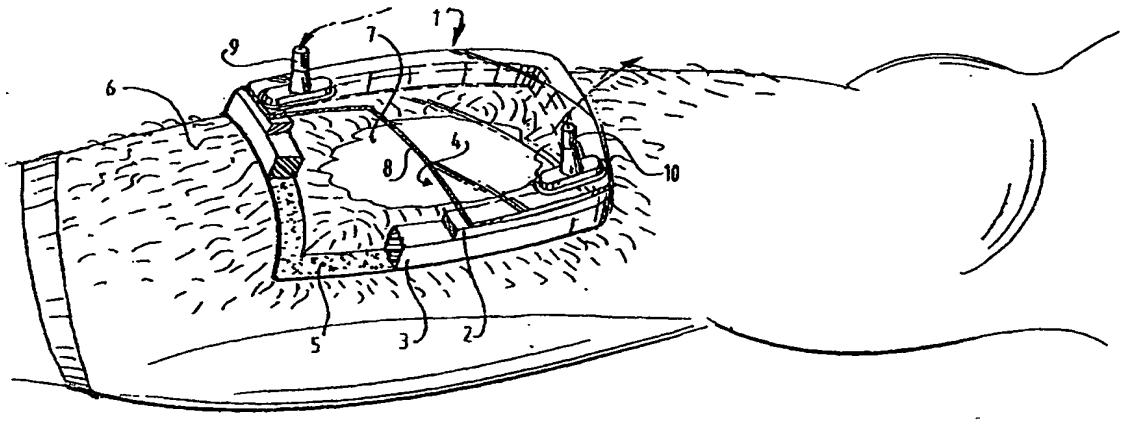
(54) Title: DEVICE FOR TREATING A WOUND IN THE SKIN OF A PATIENT



(57) Abstract: A device for treating a wound in the skin of a patient by exposing the wound to a medium, which characterized in that the device comprises at least one wall which can be connected in an at least substantially medium-tight manner with skin tissue surrounding the wound so as to form an at least substantially medium-tight chamber between the wound and the wall, wherein the wall is rigid to such an extent that it is held spaced apart from the wall.

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DEVICE FOR TREATING A WOUND IN THE SKIN OF A PATIENT

The invention relates to a device for treating a wound in the skin of a patient by exposing the wound to a medium.

Such a device is known from US patent no. 4,608,041 (Nielsen). The known device consists of two layers of plastic foil, which have been joined locally by welding or glueing. Perforations functioning as outlet openings are formed at the location of the welds, whilst perforations functioning as inlet openings are formed in intermediate areas in the layer of foil facing the wound. When this prior art device is connected to a gas supply, cushion-like spaces are formed, which are filled with the gas. As a result, gas flows are directed from said spaces onto the wound via said inlet openings, which gas flows can subsequently escape into the environment through the outlet openings. The gas that is used may be oxygen, for example, which functions to hasten healing of the wound and reduce itching of (skin surrounding) the wound.

One drawback of the device that is known from the aforesaid US patent publication is the fact that the soft plastic foil facing the wound can easily come into contact with the wound and thus be contaminated with germs, such as bacteria and fungi, with all its adverse consequences as regards hygiene. In practice it has become apparent that in particular the risk of subsequent contamination is quite substantial in this connection.

The object of the invention is to provide a simple, inexpensive wound treatment device which is easy to use, wherein the aforesaid drawbacks of the prior art are

eliminated, and in order to accomplish that objective, a device of the kind referred to in the introduction is characterized in that the device comprises at least one wall which can be connected in an at least substantially medium-tight manner with skin tissue surrounding the wound so as to form an at least substantially medium-tight chamber between the wound and the wall, wherein the wall is rigid to such an extent that it is held spaced apart from the wall. In this manner any contact between the wall and the wound is rendered impossible, which prevents contamination of the device with germs from the wound. In addition, the medium-tight chamber is thus optimally filled at all times with a medium that helps the wound to heal faster. In this regard, the term sufficiently rigid that is used in connection with the wall of the chamber is understood to mean that the presence of an elevated pressure in the chamber is not required in order to ensure that the wound and the wall remain spaced apart. It is even preferred to maintain in the chamber a reduced pressure in comparison with the environment. The terms "medium" and "medium-tight" as used above are in particular understood to mean "gas" and "gastight", respectively, wherein the gas is preferably a gas mixture containing ozone gas.

In one preferred embodiment of a device according to the invention, the wall is at least substantially made of a flexible material, which is capable of following the contours of the body part surrounding the wound. As a result, the device can be fitted around a round body part, for example, such as an arm of a leg, in a simple manner, whilst in addition the device does not interfere with the patient's movements.

In another preferred embodiment of a device according to the invention, the wall is at least partially made of a transparent material so as to enable inspection of the

wound.

In another preferred embodiment of a device according to the invention, the device is a disposable product.

In another preferred embodiment of a device according to the invention, the device can be cut to a size corresponding to that of the wound by the patient. This will be explained in more detail yet hereafter.

In another preferred embodiment of a device according to the invention, the device comprises an inlet for a healing medium selected from the group of ozone gas (O_3) or a mixture of ozone gas (O_3) and oxygen gas (O_2). Research has surprisingly shown that ozone gas has an exceptionally healing effect on the wound. The healing effect of ozone gas in this connection is in particular based on the fact that the additionally enriched oxygen environment in and near the wound all but prevents the growth of bacteria, germs and fungi. Said ozone is preferably introduced into the chamber in a form in which it is mixed in distilled water.

The invention furthermore relates to a method for treating a wound in the skin of a patient by exposing the wound to a medium, wherein use is made of a device according to the invention.

The device according to the invention is in particular suitable for use in non-invasive therapy of chronic wounds, in particular bedsores (decubitus ulcus) and wounds resulting from diabetes (venous ulcus diabetes), inadequate blood circulation (venous or arterial ulcus cruris) and contact with fire of any part of the body (ulcus following burns). The parts of the body with open wounds that are capable of being treated accordingly are:

- in dorsal position: heels, buttocks, elbows, shoulder blades, spinal column and back of the head;

- lying on one side: knees, hips, elbows, heel, shoulders, ears and ankles;

- in seated position: buttocks, elbows, heels, knee cavities and shoulder blades.

The invention will now be explained in more detail with reference to a figure illustrated in a drawing, which is a schematic, perspective view of a preferred variant of a device according to the invention.

The figure shows the present device 1, which comprises two glued-together polyurethane foam layers 2, 3, which jointly enclose a cavity or chamber 4. Lower foam layer 3 is fixed to the skin 6 surrounding a wound 7 in a gastight manner by means of adhesive tape and/or incision foil 5. The box-shaped whole is covered with a transparent PET cover 8, so that the wound 7 can be inspected from outside. Connection 9 functions to supply a mixture of ozone gas and oxygen gas to the box-shaped chamber 4, whilst connection 10 functions to discharge (mainly) oxygen gas. Device 1 thus forms a "cheese cover"-like conditioning chamber around wound 7.

Device 1 is flexible in longitudinal direction or in transverse direction, so that it can easily follow the round contour of the part of the body surrounding wound 7. On the other hand, the device 1 is so stiff that the foam layers 2, 3 and the cover 8 are held spaced apart from the wound 7, so that they cannot come into contact therewith.

Although it is preferable to use a few types of devices

1 that vary as regards size (depending on the size of the wound), it is also possible to reduce the device 1 by cutting the cover 8 to size and remove a central, transverse portion from the foam layers 2, 3 and interconnect the remaining portions of the foam layers, for example by glueing.

CLAIMS

1. A device for treating a wound in the skin of a patient by exposing the wound to a medium, characterized in that said device is a disposable product comprising at least one wall which can be connected in an at least substantially medium-tight manner with skin tissue surrounding the wound so as to form an at least substantially medium-tight chamber between the wound and the wall, wherein the wall is rigid to such an extent that it is held spaced apart from the wall, which wall is at least substantially made of a flexible material which is capable of following the contours of the body part surrounding the wound, wherein the device comprises an inlet for introducing a healing, ozone-containing medium into the chamber as well as an outlet for discharging used medium from the chamber.

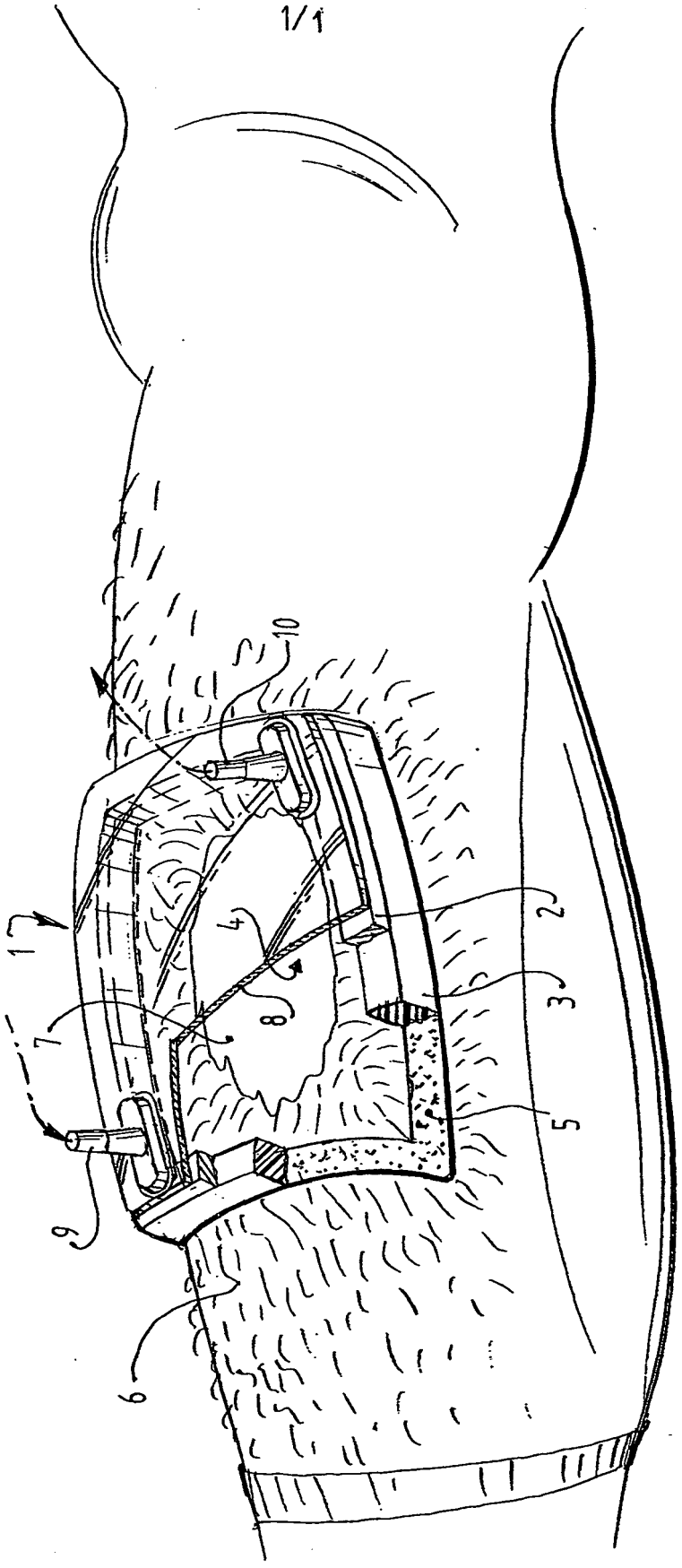
2. A device according to claim 1, wherein the wall is at least partially made of a transparent material so as to enable inspection of the wound.

3. A device according to claim 1 or 2, wherein the device can be cut to a size corresponding to that of the wound by the patient.

4. A device according to claim 1, 2 or 3, wherein said healing medium comprises a mixture of ozone gas and oxygen gas.

5. A method for treating a wound in the skin of a patient by exposing the wound to a medium, wherein use is made of a device according to any one of the preceding claims 1 - 4.

FIG.1



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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61F A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	EP 0 082 596 A (BAXTER TRAVENOL LAB) 29 June 1983 (1983-06-29) the whole document	1,2,4,5
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[X] Further documents are listed in the continuation of box C. [X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 355 186 A (SQUIBB & SONS INC) 28 February 1990 (1990-02-28) column 3, line 28 -column 6, line 15; figures	1,2,4,5

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